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(71) Applicant(s)

McAlpine & Company Ltd
(Incorporated in the United Kingdom)
Kelvin Avenue, Hillington, GLASGOW, G52 4LF.
United Kingdom

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(72) Inventor(s)

James Edward McAlpine

(74) Agent and/or Address for Service

Marks & Clerk
19 Royal Exchange Square, GLASGOW, G1 3AE,
United Kingdom

(54) Abstract Title
Waste plug

(57) A waste plug 10 is described having a telescopic stem portion 14 which may be extended or retracted by application of a vertical force by a user to open or close the plug 10. The lower end of the stem portion 14 carries a threaded stud 38 on which is mounted a smooth cylindrical member 36. The cylindrical member 36 is normally received within an aperture of a sink or bath waste 50, so allowing the plug 10 to be removed from the waste 50 for cleaning or replacement. Alternatively, the cylindrical member 36 may be removed to expose the threaded stud 38, which may then be screwed into the aperture of the waste 50 so as to secure the plug in position, to prevent it from being removed accidentally.

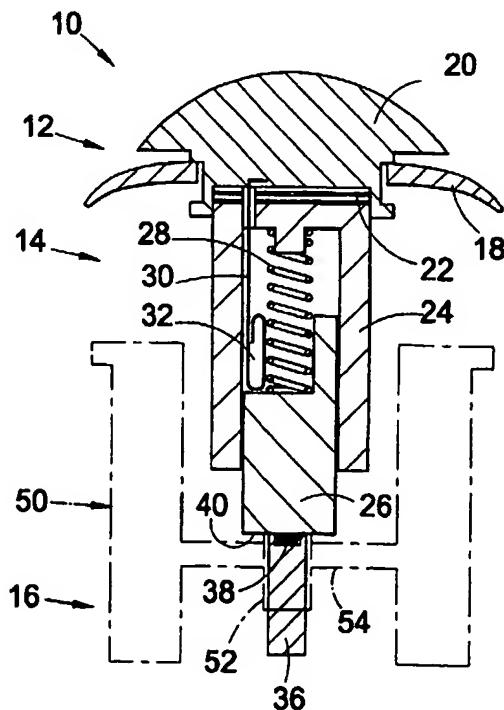


Fig.1

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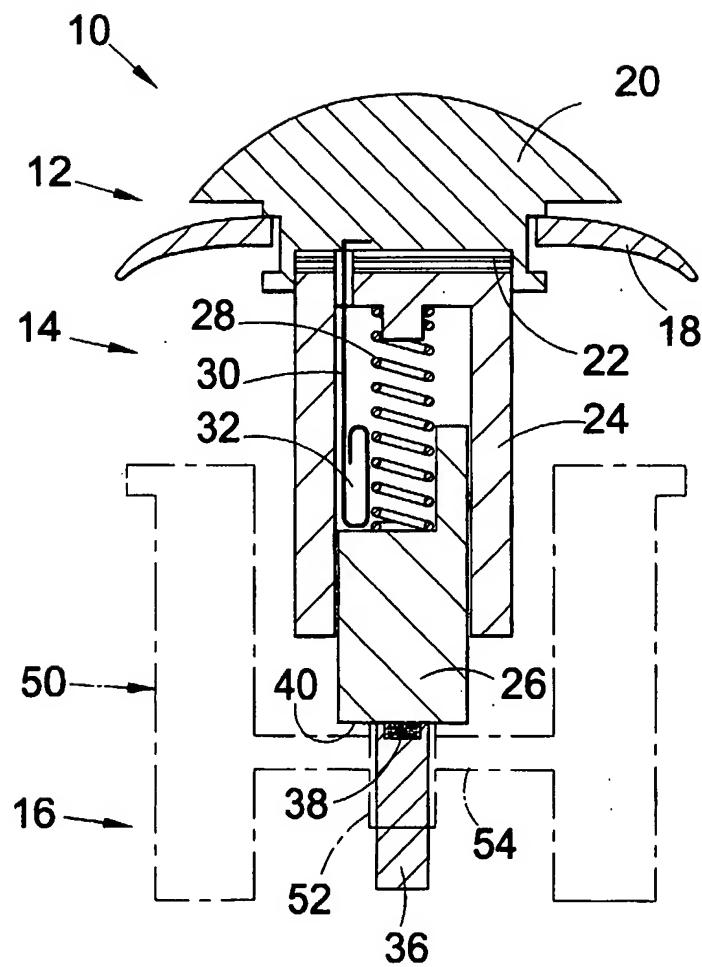


Fig.1

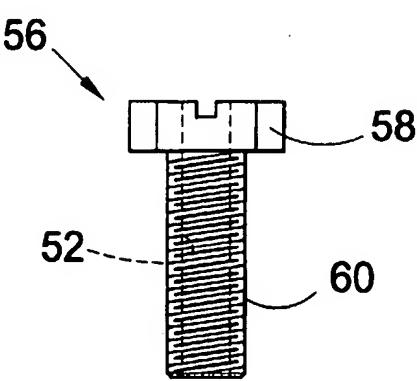


Fig.2

WASTE PLUG

The present invention relates to a plug for use in a waste or the like, and particularly but not exclusively to a plug for use with sinks and wash hand basins. More 5 specifically, the invention relates to an improved waste plug for use by persons with restricted dexterity.

Wash hand basins and sinks are typically provided with a plug for covering the outlet (known in the plumbing trade as the "waste") and preventing escape of water from the 10 basin. The typical plug is in the form of a simple disc of resilient material, such as rubber or plastics, secured to the body of the sink by means of a length of chain. The plug is held in place in the waste by an interference fit. Removal of the plug is relatively straightforward for 15 persons of average dexterity, since the chain can be simply gripped and pulled, so removing the plug from the waste.

An alternative arrangement is to provide a plug mounted on a lever mechanism which is actuated via a pull or similar arrangement. However, such plugs involve a 20 number of separate parts, and can be expensive to produce.

In addition, sinks and basins must typically be specifically produced to utilise such plugs; conventional sinks cannot easily be retrofitted with such an

arrangement. In addition, where a user is of severely restricted dexterity, they may be unable to manipulate the lever mechanism.

It is among the objects of embodiments of the present invention to obviate or alleviate these and other disadvantages of known plugs. It is further among the objects of embodiments of the invention to provide a plug arrangement which is simpler to use for reduced dexterity individuals.

According to a first aspect of the present invention, there is provided a waste plug comprising a resilient seal member mounted on an elongate stem, the stem having a mounting portion for being freely received within a corresponding receiving portion of a waste, such that the plug is not fixed to the waste, and abutment means for abutting an opposed surface of a waste, the length of the stem being selectively variable between two configurations, for moving the seal member between open and closed positions on the application of a force to the plug.

Thus, a plug in accordance with the present invention may be simply placed within a conventional waste provided with a suitable receiving portion, such as an opening, for receipt of the mounting portion, with the mounting portion

locating the plug centrally of the waste, and the resilient seal moved into or out of engagement with the waste opening simply by the application of a force to the plug. Preferably the stem length is variable in response to a 5 force applied substantially axially to the plug. The force may be applied by means of, for example, a user's hand or fist. There is thus very little dexterity required to operate a plug in accordance with the present invention.

Plug arrangements are known in which a plug having an 10 adjustable stem member are fixedly secured to a bathtub waste; however, such arrangements require specially adapted wastes to be used which have receiving portions which can be fixed to the plug. For example, corresponding male and 15 female screw threads are typically provided on the adjustable member and the waste. Thus, such arrangements cannot be retrofitted to a conventional bathtub. By contrast, the present invention, not being fixed to the waste, may be used with a conventional waste if desired. Further, since the known plug is physically secured to the 20 waste, it is difficult to remove the plug for cleaning and the like, or replacement. The present invention, by allowing the plug to sit freely in the waste, can be easily removed, even by those of reduced dexterity, as the plug

can be held and lifted free of the waste.

Preferably the mounting portion is freely axially movable within a receiving portion of a waste; preferably also the mounting portion is substantially restrained from moving laterally. Preferably also the mounting portion is freely rotatable within a receiving portion; that is, the mounting portion is not restrained or restricted from free rotation.

Preferably the stem comprises two substantially concentric portions biased to a first length by means of a spring or the like. The stem may further comprise a latch means arranged to hold the portions in a second length against the spring bias. Application of a force to the plug may cause the latch to engage or disengage, so altering the length of the stem. Preferably the stem may be either extended or contracted by the application and release of a force in a single direction. That is, the plug may be switched from first to second positions, and vice versa, by for example pushing down on and then releasing the plug. Thus, no complex movements are necessary to operate the plug.

Preferably the buoyancy of the plug is selected to cause the plug to sink in water. Since the plug is not

secured to the waste, it must be sufficiently heavy to remain in place under its own weight. Conveniently the plug may include a metal cap disposed over the resilient seal member, so providing both weight and resistance to wear and damage; this latter property is useful if users are to open or close the plug by applying force to the metal cap. In addition, a suitable metal cap may be selected to provide aesthetic appeal to the plug.

Preferably the stem length may be varied by the application of less than around 5 lbs (2.2 kg) of force; this level of force may be exerted by a substantial majority of users, even those of restricted dexterity, and so presents little difficulty in the operation of the plug.

Preferably the plug is provided in combination with a waste having a receiving portion for receiving the mounting member of the plug. The receiving portion may comprise for example a substantially cylindrical member having a through bore; the bore may have a substantially smooth inner surface.

Preferably the mounting portion comprises an elongate member; conveniently the member has a substantially smooth exterior. Conveniently also the member is substantially cylindrical. This reduces the possibility that the mounting

portion may become stuck or otherwise fixed to the waste, and also permits free rotation of the mounting portion in the waste. Preferably the elongate member is removably secured to the remainder of the stem; conveniently by means of a screw thread arrangement. This allows the member to be removed, if desired, to expose a screw thread which may be used in combination with specially adapted wastes to secure the plug to the waste. Thus, if it is not desired to have an easily-removable plug (for example, if small children are likely to be using the basin), then the plug may be easily adapted to secure use.

Where the plug is provided in combination with a waste, conveniently the receiving member of the waste is removable. Thus, a waste may be supplied with a smooth-bore receiving member which may be removed and replaced with a threaded-bore receiving member for use with the plug when the mounting member of the plug is removed to expose a threaded portion of the stem. An external surface of the receiving member may be threaded, to facilitate removal and replacement of the receiving member from a corresponding threaded opening in the waste.

According to a second aspect of the present invention, there is provided a waste plug comprising a resilient seal

member mounted on an elongate stem, the stem being selectively adjustable to move the seal between an open position and a closed position on the application of a force to the plug, and the stem having a mounting portion for engaging with a corresponding receiving portion of a waste, the engagement being such as to allow free axial movement of the mounting portion within the waste, the stem further having abutment means for abutting an opposed surface of the waste.

10 According to a further aspect of the present invention, there is provided a waste plug comprising a resilient seal member mounted on an elongate stem, the stem being selectively movable between first and second positions to move the seal member between open and closed positions on application of a force to the plug, and the stem having a mounting portion for entering without interference a corresponding receiving portion of a waste, such that the mounting portion may be removed axially from the waste without lateral or rotational movement.

15 20 According to a yet further aspect of the present invention, there is provided a plug and waste in combination, the plug comprising a resilient seal member mounted on an elongate stem, the stem being selectively

movable between first and second positions to move the seal member between open and closed positions on application of a force to the plug, and a mounting portion removably secured to the stem by means of a threaded stud; and the
5 waste comprising a spider having a receiving portion for freely receiving the mounting portion therein, the receiving portion being removable or replaceable, to allow provision of a threaded receiving portion for securely engaging with the threaded stud of the plug.

10 Preferably the mounting portion and receiving portion in combination allow the plug to be freely moved axially within the waste to allow removal of the plug from the waste.

15 These and other aspects of the present invention will now be described by way of example only and with reference to the accompanying Figures, in which:

Figure 1 shows a cross sectional side view of a plug in accordance with one embodiment of the invention; and

Figure 2 shows a side view of a replaceable receiving member for a waste as may be used with the plug of Figure
20 1.

Figure 1 shows a cross sectional view of a plug 10 comprised of a head portion 12, a stem portion 14, and a

mounting portion 16. The head portion 12 includes a resilient elastomeric seal ring 18 mounted on a solid metal, typically brass, cover member 20. The metal cover member 20 is secured to the stem portion 14 by means of 5 cooperating screw threads 22.

The stem portion 14 consists of two concentric cylindrical members 24, 26, and a compression spring 28. The lower cylindrical member 26 is telescopically received within the upper member 24, and carries an angled inclined cam track 32 in which rides a spring metal cam follower 30 mounted to the upper cylindrical member 24. The compression spring 28 biases the lower cylindrical member towards the extended position, while the cam track 32 has two stop positions, one at the upper end and one at the lower end 10 thereof, with an inclined path leading from the upper to the lower stop, and a further inclined path returning from 15 the lower to the upper stop.

The mounting portion 16 of the plug comprises a smooth-surfaced cylindrical member 36 secured to the lower 20 end of the lower cylindrical member 26 of the stem portion 14 by means of a short threaded stud 38. The smooth cylindrical member 36 is removable to expose the stud 38.

In use, the plug 10 operates as follows. The plug

assembly 10 is located in a conventional sink waste 50 (indicated in the Figure in chain-dotted outline), with the smooth cylindrical member 36 seating within a corresponding smooth opening 52 at the centre of the spider 54 of the waste 50, and so preventing lateral movement of the plug 10. The lower surface 40 of the stem 14 abuts an upper surface portion of the spider of the waste to support the plug 10 on the waste.

The plug 10 is illustrated in Figure 1 in the open configuration, which will allow water to flow through the waste. To close the plug 10, a user will apply pressure to the upper surface of the cap 20, for example with the flat of their hand. This will apply a compressive force to the stem portion 14 of the plug 10, and cause the upper cylindrical member 24 to move downward around the lower cylindrical member 26. The cam follower 30 will ride along the cam track 32 from the upper stop position to adjacent the lower stop position, being guided along the incline of the track. When the cam follower 30 reaches the lower stop position, and the user releases the pressure on the plug 10, the compression spring 28 urges the two portions of the stem apart once more, causing the cam follower 30 to abut the lower stop of the cam track 32, so retaining the two

stem portions in the compressed or closed configuration. Thus the stem will be retained in a shortened configuration, in which the elastomeric seal ring 18 seats over the opening of the waste, so preventing fluid outflow therethrough. The plug 10 is thus closed.

5 To open the plug, the user again applies a force to the upper surface of the cap with the heel of their hand. As the stem 14 is compressed further, the cam follower member 30 moves out of alignment with the lower stop of the 10 cam track 32. The incline of the cam track now serves to guide the cam follower 30 away from the lower stop and to return it to align with the first, upper stop, as the user releases the force from the plug 10, allowing the spring 28 to move the two portions of the stem apart once more. The 15 upper stop acting against the cam follower 30 serves to prevent the stem portions from coming apart completely. The stem 14 is thus lengthened, so raising the cap 20 and seal 18 above the waste and opening the plug 10.

Should the user wish to remove the plug 10 altogether 20 from the sink waste, this can be done simply by lifting the entire plug assembly 10 from the waste. The smooth cylindrical member 36 allows the plug 10 to be removed without any complex motions being necessary. The weight of

the plug 10, in particular the metal cap 20, is sufficient to retain the plug 10 in the waste without the need for securing it therein.

However, if it is desired to secure the plug 10 in the waste, for example to prevent small children from inserting fingers and other objects in the waste, the smooth cylindrical member 36 may be unscrewed from the stem 14 to reveal the screw threaded stud 38. Substitution of the smooth bore 52 in the spider 54 of the waste 50 with a threaded bore (by, for example, providing the bore 52 and the threaded bore on further threaded members which may be removed from the spider and replaced) allows the plug assembly 10 to be screwed into the spider, so preventing easy removal of the plug 10. Substitution of the spider bore may be achieved easily by the expedient of making the bore as part of a further threaded member which can itself be screwed into the spider to secure it therein. A suitable member is illustrated in Figure 2. This shows an elongate member 56 having a hexagonal head 58 and an external threaded surface 60 for engaging with a portion of a waste spider, such as that described with reference to Figure 1. A bore 52 is formed through the member 56; the bore may be threaded or unthreaded, depending on the type of plug the

member is to be used with.

It will be seen from the foregoing, therefore, that the present invention provides a plug assembly which may be easily operated by persons of reduced dexterity, and yet 5 can also be removed from a sink or basin waste by those same persons. Further, the plug of the present invention may if desired be secured to the waste to prevent its removal. In addition, the facility to secure the plug to the waste may be used to prevent children and others from 10 inserting a finger or other objects into the waste.

CLAIMS

1. A waste plug comprising a resilient seal member mounted on an elongate stem, the stem having a mounting portion for being freely received within a corresponding receiving portion of a waste, such that the plug is not fixed to the waste, and abutment means for abutting an opposed surface of a waste, the length of the stem being selectively variable between two configurations, for moving the seal member between open and closed positions on the application of a force to the plug.

2. The plug of claim 1, wherein the stem length is variable in response to a force applied substantially axially to the plug.

3. The plug of claim 1 or claim 2, wherein the mounting portion is freely axially movable within a receiving portion of a waste.

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4. The plug of claim 3, wherein the mounting portion is substantially restrained from moving laterally.

5. The plug of claim 3 or claim 4, wherein the mounting portion is freely rotatable within a receiving portion.
5. The plug of any preceding claim, wherein the stem comprises two substantially concentric portions biased to a first length by means of a spring or the like.
10. The plug of claim 6, wherein the stem further comprises latch means arranged to hold the portions in a second length against the spring bias.
8. The plug of any preceding claim, wherein the stem may be either extended or contracted by the application and release of a force in a single direction.
15. The plug of any preceding claim, wherein the buoyancy of the plug is selected to cause the plug to sink in water.
20. The plug of any preceding claim, wherein the stem may be adjusted by the application of less than around 5 lbs (2.2 kg) of force.
11. The plug of any preceding claim, wherein the mounting

portion comprises an elongate member.

12. The plug of claim 11, wherein the mounting member has a substantially smooth exterior.

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13. The plug of claim 12, wherein the mounting member is substantially cylindrical.

14. The plug of any of claims 11 to 13, wherein the 10 elongate member is removably secured to the remainder of the stem.

15. The plug of claim 14, wherein the elongate member is removably secured to the remainder of the stem by means of 15 a screw thread arrangement.

16. The plug of any preceding claim, provided in combination with a waste having a receiving portion for receiving the mounting member of the plug.

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17. The combination of claim 16, wherein the receiving portion comprises a substantially cylindrical member having a through bore.

18. The combination of claim 17, wherein the bore has a substantially smooth inner surface.
19. The combination of any of claims 16 to 18, wherein the receiving member of the waste is removable.
20. The combination of claim 19, wherein an external surface of the receiving member is threaded.
21. A waste plug comprising a resilient seal member mounted on an elongate stem, the stem being selectively adjustable to move the seal between an open position and a closed position on the application of a force to the plug, and the stem having a mounting portion for engaging with a corresponding receiving portion of a waste, the engagement being such as to allow free axial movement of the mounting portion within the waste, the stem further having abutment means for abutting an opposed surface of the waste.
22. A waste plug comprising a resilient seal member mounted on an elongate stem, the stem being selectively movable between first and second positions to move the seal member between open and closed positions on application of a force

to the plug, and the stem having a mounting portion for entering without interference a corresponding receiving portion of a waste, such that the mounting portion may be removed axially from the waste without lateral or 5 rotational movement.

23. A plug and waste in combination, the plug comprising a resilient seal member mounted on an elongate stem, the stem being selectively movable between first and second 10 positions to move the seal member between open and closed positions on application of a force to the plug, and a mounting portion removably secured to the stem by means of a threaded stud; and the waste comprising a spider having a receiving portion for freely receiving the mounting 15 portion therein, the receiving portion being removable or replaceable to allow provision of a threaded receiving portion for securely engaging with the threaded stud of the plug.

20 24. A waste plug substantially as described herein, and as illustrated in the accompanying drawings.



INVESTOR IN PEOPLE

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Claims searched: 1-24

Examiner: D. Haworth
Date of search: 11 July 2002

Patents Act 1977

Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): A4N (N3F2)

Int Cl (Ed.7): A47K 1/14

Other: Online: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2334885 A (Hughes)	1 at least
X	GB 2174899 A (Cuschera)	1 at least
X	US 5819328 A (Lewis)	1 at least
X	EP 0342819 A (Price Pfister)	1 at least

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